

New reconsideration of the Ouled Maallah geological map based on Biostratigraphic data

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Abstract

The present map is a part of the geological map of Sidi M'hamed Benali at 1/50,000 scale, whose surveys were made by Brives (1857), Perrodon (1957) and Welter *et al.* (1959). The contours of the geological formations are modified and samples taken for new dating purposes. The sector concerned by this study is located in the Dahra massif including a part of the northern margin of Chelif plain, extending between the wadis Er Razzaz in the East and Tarhia in the West. Their geological series is characterized by a basement of Cretaceous sandy marls with carbonates and blackish levels; the Cenozoic formations are there represented by mio-plio-quaternary deposits. These localities are well known for their hydrocarbon indices (Ain Zeft) and their mining potential (gypsum-selenite).

Introduction

Many detailed sections in the Ouled Maallah mounts illustrate the geometric arrangement of the mio-pliocene sedimentation which is marked by a brittle and plicative tectonics (anticline and syncline, folds). These structures are observable since the mouth of the Chelif river, near Mostaganem, to Tenes agglomeration (Derder *et al.*, 2011, Maghraoui *et al.*, 2002). This locality offers a Pliocene transgressive and discordant marine marl series on a pleated massive gypsum-selenite which has acquired its important morphologies during the Messinian and before the beginning of the lower Pliocene age. The preliminary data were obtained from the field prospection using Biostratigraphic calibration methods, focusing on marine deposits (planktonic foraminifers, calcareous nannofossils). The pliocène samples have revealed from bottom to top a complete succession of planktonic foraminifera's markers (Belkebir *et al.*, 1996). The same samples subjected to the analysis of the nannofossils revealed the presence of important Biostratigraphic markers having to change the previous geological attributions. These data allow us to reconsider the geological map of this locality and to clarify the well known mineralization in the region of Oullad Maallah.

The study area is a part of the Chelif Miocene basin, surmounted by transgressive and discordant pliocene deposits, it extends along a series of north-east-southwest parallel structures.

The topography area's presents average altitudes, about 500 meters, arriving up to 600 meters, at the level of the Est-Ouest, reddish mountainous series of Pliocene. These lines represent a barrier lines. they are clearly visible from the Chelif plain, which represents the whole southern part of the map.

Methods and Materials

The preliminary data were obtained from the field prospection and the dating of the geological land. Two methods of relative dating are used for marine deposits: planktonic foraminifers observed with a binocular loupe and calcareous nannofossils observed with the optical Microscope.

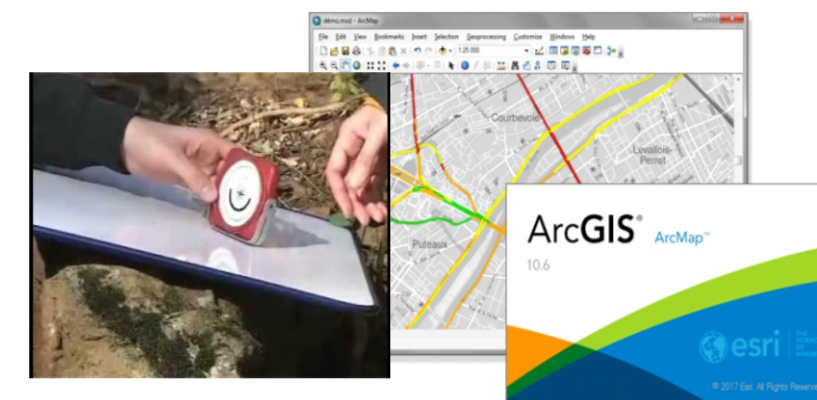


Figure 1. field data is shown and saved to the software



Figure 2. planktonic foraminifers observed With binocular loupe

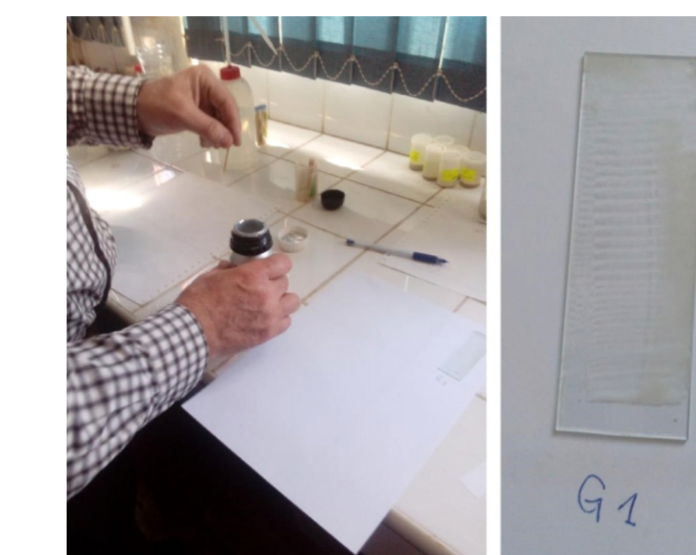
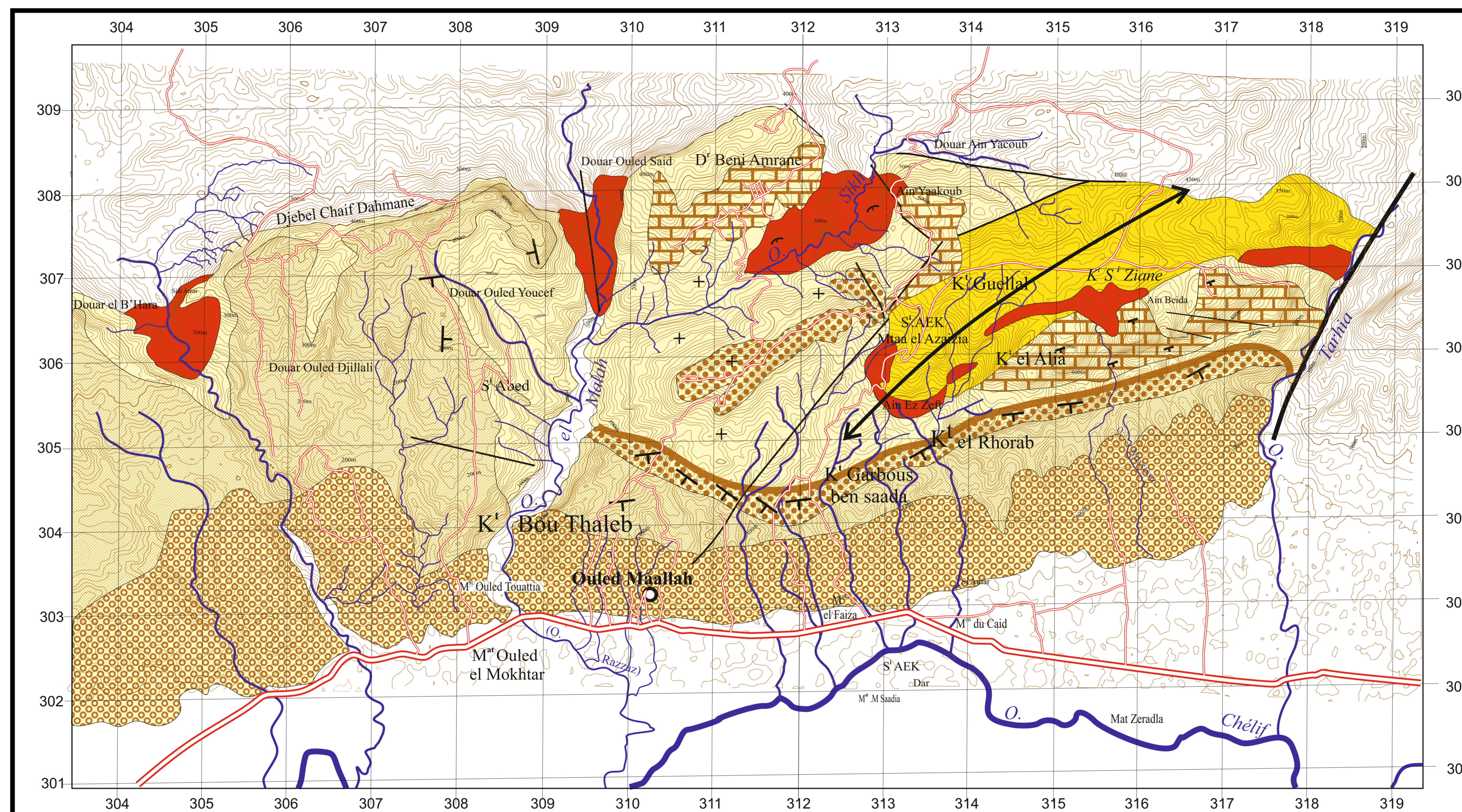
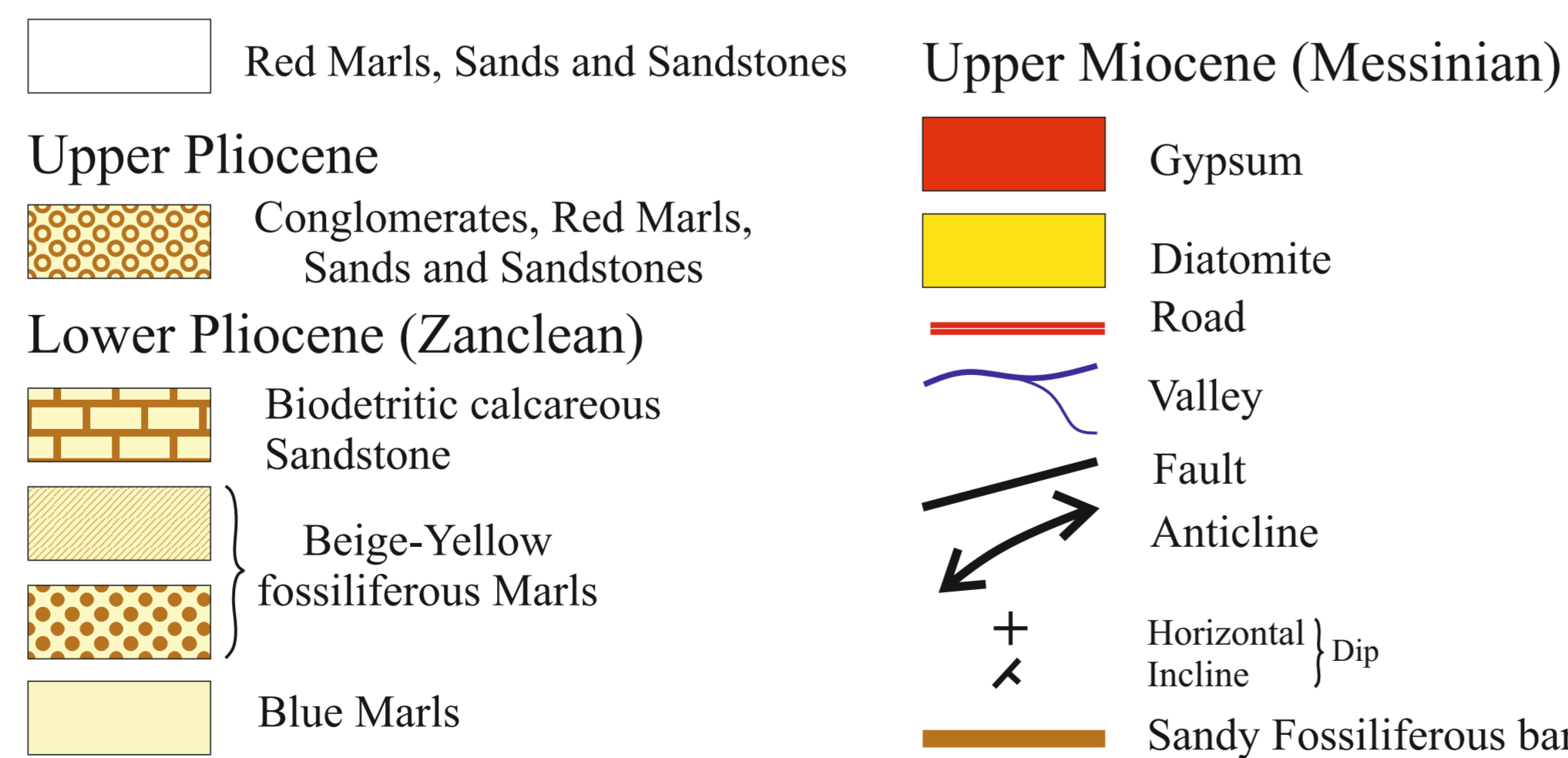


Figure 3. calcareous nannofossils observed with the optical Microscope.



Geologic Map (modified) of Sidi M'hamed Benali Scale (1/50.000) : 0 1km



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Some Lithological descriptions

Continental Pliocene

Stony, reddish, east-northeast-trending of stony formations, there dip is about 60° to the south, this line was affected by N-S and NNE, SSO faults. The continental Pliocene begins with about, ten meters of reddish-yellow sandstones, and whitish limestones beds with macroremains (roots). It ends with alternating siltstone and conglomerates.

Marine Pliocene

Lower member: The marine Pliocene offers a formation of blue to whitish marls which rests on a massive gypsum-selenite. It presents a horizontal marl and limestone alternations, with abundant *Neopycnodonte (Ostrea) cochlear*, well visible at the Azaizia locality. Marine Blue marls are very fossiliferous (solitary Scleractinia, gastropods, Scaphopods, bivalves, ...). From the deep environment, the upper levels are marked by *Globorotalia crassaformis* tending to the top to an infralittoral environment with abundant marine fauna and fossil remains of proboscideans (elephants: Garbous Ben Saada locality). This Pliocene transgression invades the deformed morphology of previous geological layers, particularly the Messinian gypsum structure which reaches its maximum of thickness, at Oued Sikh.

Upper member: yellowish bioclastic calcareous sandstone, very rich in fossils, notably calcareous shells, fragments of bivalve mussels; Pectens, gasteropods. This member reaches its maximum of thickness (more than 150 m) towards the West. It represent an angular unconformity. On the top of lower limb, this unconformity is well visible at Oued Tarhia. Its thickness becomes more important toward the West and that goes from a "molasse" with *Lithothamnium* in K'Moules Settara to a bio-detritic calcareous sandstone toward the west.

Messinian Deposits

Lower Member White marl and diatomic marl alternation known as "Tripolis", are clearly visible in the window structure of Oued Sikh Gypsum. These deposits expose the heart of a NE-SO anticline at Kt Guellal; it reaches its maximum thickness toward the North East

Upper Member 70 m of a massif gypsum thickness, it reaches its maximum thickness a little bit to the East, to reach a 150 m, in Oued Razzaz. The gypsum outcrop represent a NE-SO plicative structures; it is visible in many places from the study area, example: Si Amar, Oued Razzaz, Oued Sikh and Oued Tarhia; the plicative structure is strongly inclined to disappear under the marine Pliocene and the reddish continental formation toward the East.

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References;

Derder M.E.M. *et al.*, 2011. *Schattner U. edit., Intech publisher, Rijeka (Croatie), pp. 1-26.*
Belkebir L. *et al.*, 1996. *Elf Aquitaine Edition, Pau, 16, pp. 553-561.*
Brives A. 1857. *Carte géologique au 50 000è de Sidi M'hamed Benali (ex. Renault)*
Maghraoui M. Et Pandrelli S., 2012. *Ann. Geophys. 55, 5.*
Perrodon A. 1957. *Bull. Serv. Géol. Algérie, 12, 323 p.*
Welter *et al.* 1959. *Carte géologique au 1/50 000è de Sidi M'hamed Benali (ex. Renault)*